safety science

Special Issue Article: Risk Analysis Validation and Trust in Risk Management

Theory informed by practice. Application informed by purpose. Why to understand and manage risk, cultural context is the key.

Bill Durodié

Department of Politics, Languages and International Studies, University of Bath, UK

ABSTRACT

Risk analysis and risk management are reliant in order to be effective on their ability to engage with and communicate to non-specialist audiences, whether these be policy-makers asked to turn the advice that they agree with into practice, those implementing decisions, or the public, who are often on the receiving end of these.

Accordingly, there needs to be clarity of purpose regarding – and reflected through – the language used, the partners engaged, and the proposed ends of any measures to be implemented. These elements sit within specific cultural contexts – both geographical and historical – and it is essential to account for these in translating theory into practice.

This article surveys the discourse used across various examples, including a detailed case study. The most significant conclusion is that while data and evidence certainly matter for validation – understanding culture remains key to effective risk analysis and trustworthy risk management because, on the whole, people look for meaning beyond the mere '*facts*'.[1] This applies to risks assumed to be narrowly technical as much as those with a strong social, cultural and political dimension.

Insufficient risk analysts and safety experts consider or account for the broader, contextual and cultural factors that impact their choices, analyses and modes of dissemination.[2] This creates a divide between those commissioning and conducting the research and those to whom it is held to apply and needs to be implemented by, which undermines democratic accountability, as well as the possible benefits of, and trust in, their enterprise.

KEYWORDS

Risk; Culture; Trust; Values; Strategy; Engagement

[1] A recent exemplar of this might be the election of Donald Trump as the President of the United States of America, where despite his detractors being supported by an army of '*fact-checkers*' and voters being alert to his lies (and personality flaws), still he was elected, on the basis presumably, of what he appeared to stand for, beyond the immediate evidence.

[2] '*Human factors*' analysis tends to focus on individual needs and foibles rather than their wider societal framing.

1. Introduction

Risk analysis and risk management have exploded into public prominence in the thirty years since the publication of Ulrich Beck's *Risikogesellschaft* (1986), and even more so following its translation into English (as *Risk Society*) in 1992 within the context of the aftermath of the collapse of the old – Cold War – world order.[3]

The concept of risk was previously applied mostly in relation to engineering and finance, but through Beck's work it came to assume a new significance with respect to social and cultural matters, such as the environment (his initial impetus), as well as public health, security and even interpersonal relations.

Journals such as *Risk Analysis* were reinvigorated and many others were launched around this time (e.g. the *Journal of Risk and Uncertainty* (1988) in the US, and the *Journal of Risk Research* (1998) in Europe). Countless new courses, conferences and centres focusing on risk also emerged.[4]

Much of the early discussion was more conceptual in its framing than now. What is a risk? Who decides? Are risks objective or socially constructed? To what extent could the psychometric paradigm or cultural theory shed any light? How ought we to go about mitigating presumed impacts or consequences?[5]

Inevitably – over time – the emphasis shifted towards measuring social risks and public perceptions more carefully as well. So-called '*human factors*' also became more prominent, and a quantitative element emerged in these areas. But with this there arrived a number of new problems. As risk analysis has increasingly embraced advanced mathematical modelling, to what extent is it still able to speak to the audiences it needs to reach – from policy-makers through operational implementers to the wider public?

How do these audiences engage with and decipher the often very detailed and complex analytical frameworks developed over considerable time-spans by industry experts and academics? And – even more challengingly – are those experts themselves clear and in agreement as to their aims and purposes, as well as the possible consequences of their projections and the resonance of these – or not – among those they are held to be advising?

A disconnect with others, and a concomitant '*culture of suspicion*', is considered to be one of the many possible sources of mistrust in a system (O'Neill, 2002). What's more, empirically focused risk analysts may be less versed in the study of social forces and the understanding of cultural change than they could be.

---

[3] Furedi (2002), for instance, notes a ten-fold increase in reference to the phrase '*at risk*' in British broadsheet newspapers across the latter part of the 1990s.

[4] The Centre for Analysis of Risk and Regulation (CARR) at the London School of Economics from 2000, and the King's Centre for Risk Management (KCRM) at King's College London from 2002, to name just two of the new centres putting on various courses and conferences.

[5] See, for instance, Slovic (1987), Adams (1995), Fischhoff (1995) and Renn (1998).

The point may not be so much a need to respond to presumed risks as to influence how these are perceived of in the first place. This latter is often a moral and political task relating to societal values and mental frameworks that those directing or serving the public may not have fully considered (Douglas and Wildavsky, 1982).

For instance, whilst it is clear that World Health Organization officials did understand the possible role and impact of the media and social media on how their messages pertaining to 2009 H1N1 pandemic influenza were received, it is less evident that they understood their own role within this, still less that of the cumulative impact of previous health communications and emergencies upon the public imagination at that time (Durodié, 2011).

That the first cases emerged in rural Mexico where the challenge of accessing health services skewed reporting away from the norm ought also to have been a cause for greater circumspection on their part from the start. And, to argue that it was only with hindsight that the concerns could be viewed as having been disproportional to the actual threat is to miss the extent to which it was cultural framing more than virology that shaped and drove the response and ensuing policy.

Accordingly, before embarking on exploring this any further it will help to present a few other examples and the dilemmas that arise from them. These are not held to be typical necessarily but rather serve as vignettes offering a lacuna into some of the key challenges and processes that ought to concern us.

2. Algebra for real life?

2.1. A very brief example from the UK

On 18 April 2016, some two months prior to the referendum in the United Kingdom to consider its continued membership of the European Union (EU), the then Chancellor, George Osborne, launched a Treasury analysis document on the purported economic impacts, were the UK to leave the EU (HM Government, 2016).

In effect, this was a 200-page quantitative risk analysis of what some forecasters expected to occur. Detractors lambasted it as scaremongering and a waste of public funds (BBC, 2016a), while the media and other campaigners projected its headline prognosis that every household would be £4300 worse off as a consequence of any '*Brexit*' vote.[6]

Leaving aside the politics of the matter, (Durodié, 2016) what is more apposite here is to consider the report as just one of the latest exemplars of a growing trend to publish weighty tomes to back-up particular views pertaining to public policy on socially related risk and to project what ought to be done about these.

Noting the incongruence of such a lengthy and complex work being promoted to inform public debate on a decision that was both imminent and important, *The Telegraph* (in many ways the house journal of the British establishment that one

[6] Brexit – short for British exit – was the term used for the decision by the UK to leave the EU.

might have imagined would rally to the Conservative Chancellor's cause) ran a skit, supposedly depicting two men in a pub (to be read as working class as evidenced through the portrayal of their Estuarine pronunciation),[7] deliberating over the finer points of leaving the EU – or not – through reference to the convoluted algebra contained in the report:

> "*Don't know about you, Baz, but I'm voting to leave. Get immigration down, take back our country, and stop this lot in Brussels pushing us around*."
>
> "*Come off it, Dave. Be realistic. What about* ln(Tijt)?"
>
> "ln(Tijt)?"
>
> "*Yeah*, ln(Tijt)."
>
> "*What's* ln(Tijt)?"
>
> "*Well, it's equal to* $\alpha_{ij} + \gamma_t + \alpha_1 \ln(Y_{it} * Y_{jt}) + \alpha_2 \ln(POP_{it} * POP_{jt}) + \varepsilon_{ijt}$."
>
> "*God, that's a point. I'd never looked at it like that before*."
>
> "*See, it all makes sense when you think about it*."
>
> "*Fair enough, got me bang to rights there*. *And there was me thinking* 3 x (Tijt) = $\alpha_{it_1} * Y_{jt} + (X * Y_{it}) + 2X_{it_3} - \varepsilon_{ijt}$."
>
> "*Jesus, Dave, where do you get this rubbish? You've got to stop reading the Daily Star*."

As the part-Irish comedian Paul Merton noted wryly on the satirical BBC television show *Have I Got News For You* a few days later (BBC, 2016b), '*the last four letters seem to spell eejit*'.[8] Presumably, in his mind at least, the real '*eejit*'s here were those who had prepared the over-detailed 201 page forecast in the first place.

2.2. A longer example from the Netherlands with consideration of wider implications

In 2007, the Dutch government developed a new National Security Strategy informed by a detailed National Risk Assessment (MIBZK, 2007), the methodology for which was published the following year. This latter coincided with the production in the UK of the first National Risk Register (Cabinet Office, 2008) and, as Vlek has noted (2013), other countries soon followed suit, including Australia, Canada, Germany, New Zealand, Norway, Sweden, Switzerland and the United States. By 2014, the process had reached its sixth iteration in the Netherlands alone, engaging a significant number of experts in its preparation (RIVM, 2014).

Unlike earlier risk assessments there that had been driven primarily by environmental protection policy, this document was designed to address as wide a range of risks as could be conceived of. Of course, these included flooding (about

[7] Emanating from the Thames Estuary around London and most evidently revealed here by the phrase '*bang to rights*' (meaning caught red-handed and '*banged-up*' i.e. put in prison).
[8] Eejit – close enough to the recurrent ε ijt term in the formulae – is Gaelic slang for '*idiot*'.

half of the land mass of the Netherlands is less than one metre above sea level), but also other emerging issues with a more social dimension at that time, such as terrorism and pandemics, as well as the assumed impact of the far-right in domestic politics, industrial accidents and social unrest. (What it failed to anticipate utterly though was the worldwide economic crash the following year).

Irrespective, the Method Guide accompanying the assessment is highly instructive in terms of outlooks and approaches both then (MIBZK, 2008), and now in its latest form (MVJ, 2014). A review of the first of these prepared in 2008 for the National Security Coordination Secretariat in Singapore identified a wide range of issues arising from it (Durodié, 2008b), four of which will be discussed further here. These are: (1) what is meant by strategy, (2) the challenge of quantifying qualitative indices, (3) who the actual decision-makers are, and (4) the use of worst-case scenarios.

2.2.1. Strategy[9]

Strategy is a much misunderstood and misused term. It is often assumed to be what those at the top do, as opposed to the operational matters that ordinary people are assumed to be more preoccupied with. But the actions of those on the ground can be strategic while our leaders may also focus on matters of little strategic bearing or consequence.

Strategy may be high-level, but it need not come from on-high. It is often developed through discourse and engagement with a wide group of people. This requires, first and foremost clarity over shared interests and purposes. And, as the world is in flux and new pressures inevitably arise, strategic development is an on-going process that necessitates continuous articulation and re-articulation.

Through establishing a common understanding of situations and encouraging identification with agreed objectives, strategy can provide a conceptual framework to guide action. It can allow us to anticipate what is expected in the absence of specific instruction.[10] So while information certainly matters in decision-making, it is often the interpretation of that information – through largely predetermined strategic outlooks, analyses, understandings or purposes – that indicates how to act.

Most significant here is the need to be clear and coherent as to one's own goals and intended direction in the first place. Surprisingly maybe, this is often lacking in many institutions nowadays, including some with important remits and responsibilities.[11] Accordingly, difficulties are often conceived of as emanating from exogenous factors when in fact they stem from internal incoherence – or an absence of agreement over strategic objectives.

---

[9] In addition to Durodié, B. (2008b) referred to above, elements of this section and section *3.1* also derive from Durodié, B. (2008a). *Strategic Information Management,* a report for the National Security Coordination Secretariat, Prime Minister's Office, Singapore, 30 October

[10] For instance, an official working when Margaret Thatcher was Prime Minister of the United Kingdom could assume without having to ask that they should work towards privatising public assets (though note the caveats at: http://news.bbc.co.uk/1/hi/458626.stm).

[11] This may explain the preponderance of policy U-turns. See, for instance: https://www.ft.com/content/d476b856-16bb-11e6-9d98-00386a18e39d).

Strategic thinking must consider the actions and reactions of external forces. But it should not be driven by these. Strategy ought to be about setting the agenda, on your terms, not simply responding to elements beyond your immediate control. The latter can lead to compromising aims, confusing cause and effect, and becoming shaped by self-fulfilling prophecies (Merton, 1948), rather than establishing one's own ends and trajectory (Freedman, 2005).

Avoiding debate, or assuming one's values and direction to be obvious, can be concealed by a surfeit of activity that appears to project a sense of purpose and determination. In fact, this allows strategic priorities to be lost sight of entirely. Focusing on vulnerabilities or unknowns elides capabilities and knowledge. In addition, a society that is confident about what it stands for – rather than merely knowing what it is against – is far better equipped to deal with adversity than otherwise.

Preparing for emergencies and handling risks then are undoubtedly strategic priorities, but the ability to do so depends on more than just technical capabilities. It is easy to forget one's broader aims and ambitions. But it is these – especially during a crisis – that truly hold people together as those: '*who believe in a cause or project are far more effective agents of it than those who are coerced or corralled*' (Durodié, 2009b).

Strategy should remind us of where we are going, not just narrow our gaze to the challenges we face now. And strategic direction is established well in advance of any specific situation emerging. Communicating effectively at such times is dependent on the shared sense of purpose and meaning already created by then. The point pertaining to the interpretation of H1N1 from a particular (negative) worldview that was mentioned earlier is particularly apposite in this regards.

But from the opening summary of the Method Guide to the first Dutch National Risk Assessment we are advised that the '*allocation of capabilities in the strategic planning phase <u>is based</u>*' (emphasis added) on the risks identified through the risk assessment (p.5). This risk assessment, in its turn, is developed from a process of listing and analysing risks that lead to the formulation of various scenarios.

Hence, it is clear that strategic priorities regarding resource allocation are held to *derive from* the identification and assessment of risks which – in keeping with the outline presented above – is not really strategic planning but rather an admission that priorities may come to be buffeted around by circumstance.

What's more, and as is often the case in forecasting, the scenarios are little more than the extrapolation of contemporary concerns – terrorism, pandemics, climate change, utility supply failures, and so on. (It is rare for the real events that shape world history – women's emancipation, the silicon chip, the end of the Cold War, market failure etc. – to be within the conceptual horizons of planners. Yet, real leadership – which presumably ought to shape strategic planning – requires engaging rather more with these possible elements).

Further, as Professor Michael Clarke (the former director of the Royal United Services Institute for Defence and Security Studies in Whitehall, London) noted, in

relation to the decision by the British government and others to participate in the conflict in Libya in 2011, key decisions readily by-pass any National Security Strategy process and need not be anticipated by it (p.7, Clarke, 2012).

As with much foresight or futurology, the Dutch strategy document was a projection of the present rather than looking to purposefully engage and positively nurture emerging trends. Accordingly, some of the concerns expressed e.g. '*annoying or threatening tourists*' (p.29) may have been little more than petty prejudices. Others, more in tune with the times, such as the fear of '*fatwa*'s (p.29) or '*statements by Dutch people in the Dutch media that are regarded by groups as (extremely) inflammatory*' (p.28) (just a few years after the Danish cartoons controversy),[12] raised difficult issues such as who decides, how many need to be offended, what level of threat is required to prompt action, in what form and on what scale?

The examples of fatality causing episodes in the document revolve around the exotic and the extreme, rather than the mundane and the mainstream. Hence, accidents at chemical plants, dyke failures, terrorist attacks, epidemics and riots were examined, but not road accident fatalities or other workplace incidents (which are often greater in number). In addition, post-traumatic stress disorder (PTSD), as well as '*fear and anger*' (p.37) were simply assumed without any mention of such categories and concepts being contextual and contested in the medical, psychiatric and sociological literature (Furedi, 2003).

The list continued through common environmental concerns (with little reference to the difficulties involved in assessing or auditing these), through social stability, and a then relatively novel focus on behaviour modification ('*takes unwise decisions about their own health*' (p.37)).[13] The possibility that this latter – leading effectively to the micro-management of everyday life – may represent a problem of its own further afield (as governments shrink back from grand visions for the future to much more limited objectives) was not entertained (Durodié, 2017).

But the categories we use and prioritise at any particular time reflect, in part, the mood of society. Accordingly, they are, to some extent at least, social constructs. And these may drive the pursuit of the very phenomena they purport to explain. So, for instance, an emphasis on vulnerability and risk may end up encouraging people to feel neglected and injured.

Rather than monitoring what the public supposedly thinks through endless surveys and data gathering it may be that a more pro-active approach by government to shape this – for instance by emphasising our inherent strengths or strategic objectives – could counter a sense of cultural pessimism in what some have come to describe as an uncertain (Furedi, 2003), or dystopian age (Demerjian, 2016).

[12] The publication, in September 2005, of 12 cartoons of the prophet Muhammad in the Danish newspaper Jyllands-Posten and the ensuing worldwide protests in early 2006 (that led to their republication through other media).

[13] This has now become quite mainstream as evidenced, for instance, by the work of Thaler and Sunstein (2008).

2.2.2. Quantifying qualities[14]

As previously noted, risk analysis has come of age over the last twenty or so years. Risk assessors, risk managers and risk communicators now play a central role at the heart of many organizations. Senior Risk Officers – a title unheard of until recently – now sit on, or advise, the Board of large corporations and public sector institutions.

The growing use of the language of risk and our increasingly organising around it require critical analysis. Does society face more risks today than ever before? Is it that the risks we face are of a different type (Beck, 1992), or evolving faster (Giddens, 1999), than previously? Have we somehow become more conscious of risks? Or are we now organising around risks more explicitly? If so, why?

In addition, there is an inherent contradiction built in to most mainstream analyses of risk, as the concept itself (in its everyday usage) attempts to reconcile elements that are incommensurable.[15] Risk is often held to represent the likelihood of a specified outcome.[16] This has two core aspects – chance and consequence (the first of which, in its turn, depends on a conscious choice or a natural cause). Hence we distinguish the intrinsic probability of a dice landing on a six from risking it all on throwing a six – a decision with an impact.

We should note that the impact is not necessarily a problem. It is good if you win – *nothing ventured, nothing gained* – and bad if you lose – *better safe than sorry* – but presumably, the bank (or the undertaker) could view these results from the opposite perspective. Events happen. It is people who determine their moral worth. So risk is an opportunity as much as a difficulty, although in recent times it appears to have become conceptualised primarily as the latter (which itself is a consequence of cultural trends we need to be alert to).

When quantifying risk, the element of human will (or choice) is often ignored and the focus is primarily on just two factors – the type of outcome, often described as a hazard, impact or consequence – and the scale of it, usually given as a probability, likelihood or exposure.[17] This is most commonly found expressed as:

RISK = PROBABILITY x IMPACT
(Or some other variation such as: Likelihood x Consequence, or: Exposure x Hazard)[18]

In some related fields, such as safety and security, risk is sometimes thought of as representing the confluence of other concepts – commonly; threat, vulnerability and

---

[14] Elements of this section derive from Durodié, B. (2009a). *Inherent Problems of Risk Assessment Methodologies*, unpublished notes prepared for students of the S. Rajaratnam School of International Studies, Nanyang Technological University, Singapore.
[15] Although Aven and Renn (2009), suggest a definition where this need not be so.
[16] A glossary of alternative definitions is provided by the SRA at:
http://www.sra.org/sites/default/files/pdf/SRA-glossary-approved22june2015-x.pdf
[17] Introducing '*human factors*' as they have come to be known, complicates this, but still requires identifying the factors and assessing their magnitudes.
[18] No suggestion is made here for these definitions to be equivalent.

consequence.[19] Risk is then conceived of as being the arena where these three overlap. It is a function of these distinct (though not necessarily independent) variables:

RISK = f (THREAT * VULNERABILITY * CONSEQUENCE)

All three are held to be necessary for a risk to exist, although quite how the elements are to be combined is far from evident. And, of course, other factors may sometimes be considered to be important too and can be brought in to the analysis – such as; intent, capability and countermeasures.

But, regardless of the number of elements, it is evident that each is to be considered both in qualitative and quantitative terms. We are concerned both by the *type* of threat, as well as the *magnitude* of it (or the *activity* and its *severity* as others would have it). Similarly with the other factors identified, no matter which or how many.

Hence, irrespective of whether we prefer using the equation; Probability x Impact, the representation; f(Threat * Vulnerability * Consequence), or another formulation, what is clear is that the concept of risk usually attempts to combine a supposedly objective value (likelihood or magnitude), with an evidently more subjective one (impact or type).[20]

This raises an inherent difficulty. That is, that in assessing risk, even in the ideal case (without concerning ourselves with the interdependency of variables or compensatory behaviour), we are always attempting to combine a quantitative measure with a qualitative one.[21] (When including '*human factors*' there is the added complication of how we are to value – quantitatively – human values – that are qualitative).

Even assuming that we have sufficient data to determine the former (and leaving aside the selection of which risks we choose to analyse and the influence of unaccounted for – or confounding – variables), there are significant challenges in quantifying the qualitative factors to combine the two elements and express a risk with a view to enabling social prioritisation.

Typically, it is necessary to assign numerical values to such elements, such as when the insurance industry determines the value of a life or a limb to compensate for fatalities or serious injuries.[22] This may be arrived at through the use of historical data or by assessing how much people are willing to pay through premiums or taxes.

But there are many problems associated with this, including how to handle situations with insufficient data (uncertainty) or reaching agreement over assigning a worth

[19] See, for example, US Department of Homeland Security (2008).
[20] Some, including one of the anonymous reviewers for this article, might propose the latter to be more objective and the former less so but, irrespective, the tension and contradiction between these remains.
[21] Again, Aven and Renn (2009), may not concur, though that remains to be clarified as without any quantification there would be little purpose in assessing, and still less prioritising, risks.
[22] Adams (1995), is quite explicit that fatalities are the only data researchers can agree upon.

(quantitative) to the things that we deem to be worthy (qualitative). And what effect might a sense of control, dread or simply greater awareness have on all these?[23]

Accordingly, it is quite possible for an individual or institution to assess a situation as being say, low-risk, while another may take a very different view based on their desire to include some other impact that was not originally accounted for, or to weight these differently. All risk assessments then – despite any objective seeming representation – are inevitably contestable as well as being contingent.[24] And a society can come to regard something or some activity as a risk that is not currently considered as such.[25]

This is even worse when disparate perceived threats to national security – such as floods, pandemics, social unrest or terrorist attacks – are to be '*rendered comparable*' through '*unambiguous*' description, '*backed up by figures*' in order to make it '*possible to prioritise actions*' as proposed in the first Dutch Method Guide (p.5). Not only does this conflate risk with uncertainty but it lends itself to generating an ever-expanding list of contemporary insecurities which, in the past, would have been handled by a range of distinct and dedicated agencies (Environment, Health, etc.).

How society responds to a particular problem is contextually and culturally determined. There is no fixed response as even identical challenges may be addressed differently according to the times (Furedi, 2007a, b and c). One incident may galvanise some into action, engendering a sense of community through an assertion of values. Another, similar one, may lead to existential angst through focusing too much on the threat, or sense of threat (Durodié, 2004).

So not only are different social threats incommensurable in terms of scale and substance but so too are equivalent ones in different historical periods. Equating these requires attributing appropriate weightings. Inevitably these work towards achieving an already provided answer. As any novice will know, the weightings determine everything, and when these are compounded and conflated pretty much any outcome can be derived. All that is needed is the right equation to prove a previously assumed argument. Needless to say, such reverse engineering is a profoundly unscientific methodology.

In fact, the Dutch documents avoid the standard risk equation altogether and focus instead on developing '*scenarios*'. Likelihood is then described as an '*expectation*' (p.6) or '*forecast*' (p.20) concerning the occurrence of the scenario. And impact is defined as '*the total of the consequences of the scenario-incident*' which, aside from being immeasurable (and opaque), restricts the discussion of risk to the various scenarios defined and described by the experts and authors in the first place.

What's more, as a later version of this document also advised, a scenario is held to be '*a description of*' a number of elements including '*the (underlying) cause of an*

[23] See, in particular, the work of Slovic on the first two of these.
[24] See, for instance, Goerlandt et al. (2017).
[25] The expansion of '*child safety*' is just one example of this. See Appleton (2006), as well as Furedi and Bristow (2008).

incident' (RIVM 2009, p.17). But how could the analysts determine *a priori* what the (underlying) causes of an incident were? Presumably these are open to interpretation, or indeed contestation? What if the experts failed to envisage a key factor? Instead, the causes are smuggled in as facts – as part of the scenario – which, lest we forget, is held here to drive the strategic planning (through the risk assessment), rather than deriving from it.

2.2.3. Who decides?

If risks (and so – according to the presentation in such documents – strategy) come to be attributed to a combination of expectations or forecasts within ascribed scenarios, the outcomes would seem to be written-in from the outset (or, at least, the alternatives not considered). Such a methodology is significantly subjective in character as whoever makes the case and variable selection determines everything.

But the authors and experts behind these reports are understandably uncomfortable to reveal quite how much of a supposedly objective methodology is chosen by them. Accordingly – whether they are conscious of it or not – this then becomes obfuscated by terminology and numbers.

Aside from developing scenarios held to impact the '*vital interests*' of Dutch society (MIBZK 2008, p.8 and MVJ 2014, p.9), irrespective of whether these have been openly interrogated, they are then dissimulated by being '*translated into one or more*' of '*ten chosen impact criteria*' (2014, p.19), which are then scored and aggregated. The process of aggregation is not discussed, but at least one of the early versions of these documents was honest enough to point to the '*high level of subjectivity*' (RIVM 2009, p.26) involved, explaining further that:

> '*the ten individual impact scores are merged using an aggregation procedure into an overall impact score; this is done in a number of ways which differ from each other in the method of weighting the importance of the criteria and the labels*' (2009, p.30)

Of course, risk analysis is not conducted in a vacuum either. Accordingly, attempts are usually made to separate the abstract assessment of risk – conducted by technical experts – from those individuals and institutions more directly accountable to the public who are charged with managing the risk based on the advice they receive. This is to avoid conflicts of interest – like '*sexed-up*' dossiers – when officials are asked to revise their assessments to make them more politically appealing to the electorate.[26] As Veland et al. note:

> *'The distinction between assessment and values is an issue that has been broadly discussed in the risk literature, and many authors argue that value deliberations belong to the decision-making sphere, and should not be part of a risk assessment'* (2013, p.354)

[26] The phrase '*sexed-up*' in this context has come to be associated with the 2002 intelligence document '*Iraq's Weapons of Mass Destruction: The Assessment of the British Government*', which is widely recognised as having allowed intended outcomes to shape the analysis.

Ultimately, decisions need not concur with the assessment and advice of experts. Warnings can be ignored and equally it is possible for problem-free prognoses to be overruled on precautionary grounds to appease presumed concerns. This is because the degree of risk people are prepared to accept is held to be socially or culturally determined and it is still assumed, for now, that this is best reflected through the views of their elected representatives rather than those of appointed officials.

However, the extent to which such representatives are willing to wade through the sheer volume of detail and confusing cacophony of different weightings provided in such documents, let-alone follow the meaning of convoluted phrases such as; '*the scenarios are compression points in the continuum of variations and possibilities*' (RIVM 2009, p.18) is a moot point and a potential stumbling block.

Nor is risk analysis pursued without purpose. Whilst it is presented as being a description of things as they are, it invariably serves to point to a prescription of what ought to be. In the language of social science it is both positive (evidence-based) and normative (policy-oriented). Impacts just are – but to label these good or bad depends on one's perspective and is a moral (individual) or political (collective) determination. Risk assessments and risk management may be conducted with the best of intentions – as decisions have to be made over what problems to prioritise and how to allocate resources – but they can also serve to conceal the value judgments behind these.[27]

Nevertheless, having elaborated quite how much of this supposedly objective process serves to combine and conceal assumptions, interests and ignorance, the emphasis throughout these documents is that it is for the Cabinet (within the Dutch government) to determine or decide (MIBZK 2008, RIVM 2009, MVJ 2014).

But nothing could be further from the truth. Having devised scenarios and adjusted weightings to reflect their world view, it is quite clear that whoever drafts these documents is under no illusion as to what and how the Cabinet should choose. Indeed, as time has moved on so increasingly the element of choice in these documents has shifted from politicians to experts. For the former not to follow the recommendations given by the latter would be considered tantamount to their wilfully ignoring the assumed facts.[28]

Of course, not really being able to choose – or having one's hand forced – may benefit a Cabinet reluctant to make key moral or political decisions. It is always easier to hide behind a set of numbers arrived at through an obscure or obtuse methodology and to say '*I had no choice, the figures dictated my course of action*', than it is to argue with, inspire and engage the public as to why particular decisions

[27] For instance, most people would apply moral persuasion rather than seek to appeal to the wealth of academic literature pertaining to the purported risks of secondary tobacco inhalation in order to deter someone from lighting-up a cigarette in their home. Presenting matters as a risk then becomes a means to avoid engagement and deliberation.

[28] This also explains why so many were indignant at the outcome of the Brexit vote in the UK. They felt that the public (and some politicians) had ignored the '*truths*' presented by experts (which rather patronisingly presumes the public to be unable to see through the implied '*lies*' as experts do).

ought to be taken and supported.[29] (The latter would further benefit from having people act as active advocates rather than unwitting recipients).

This may suit everybody's agenda – experts and politicians alike – bar the public. The experts get to design the methodology, determine the scenarios and draw-up the recommendations to facilitate the Cabinet decision, safe in the view that these ought to be accepted. In effect, a set of unelected, unrepresentative and unaccountable bureaucrats become the judge, jury and executioner of national strategy.

This serves those who have lost faith in the direction of the nominally elected representatives of society, or who fantasise about being in power themselves. It absolves those representatives of the need for difficult argument and the complications of engaging the public. But it is also a travesty – not just of democracy – but of reasoned decision-making. It can store up greater problems further afield, not least in accelerating the creation of an alienated public (or one sensing itself to be vulnerable and powerless) who, in their turn, could become one of the challenges officials may yet have to consider.

2.2.4. Worst-case scenarios

There is nothing inherently wrong with planning, but to prepare for the worst can go beyond planning and into actions that themselves have an impact (not least in deflecting attention from other challenges and diverting resources accordingly). Presumably this is what is implied when we read that:

> '*The National Risk Assessment is not concerned with what will happen in the future, but with the question as to all that could happen in the unforeseeable future and, in such events, which capabilities may be required*'. (MVJ 2014, p.9)

Earlier versions of this spoke of the need for scenarios to encompass '*the most serious imaginable*' impacts (RIVM 2009, p.18).

The problem is that it is possible to imagine a bit too much. There is a vast slippage in the world of counterterrorism for instance between intent and capability, or between possibility and probability (Furedi, 2009). Much of what passes for intent nowadays could be labelled sheer fantasy, with those concerned displaying little capability of doing anything about their ideas. Indeed, the fact that almost all terrorist incidents in the world involve conventional weaponry (and non-weapons such as vehicles), rather than the exotic technologies many concern themselves with, should alert security analysts to the dangers of this kind of speculative scenario planning.

Similarly, despite subsequent protestations to the contrary, the worldwide public health response to 2009 H1N1 pandemic influenza was also based on worst-case scenario planning. The Director General of the World Health Organization (WHO) Margaret Chan announced this as being '*all of humanity that is under threat*' (WHO 2009), prior to her and her staff having to calm matters down by noting that most cases were mild and there was no need to restrict travel or trade. But pandemic

[29] Others apply a similar reasoning to much of the rationale behind the workings of the European Union, as well as its concomitant problems (Bickerton, 2012; Heartfield, 2013).

preparedness had consistently been promoted by the WHO well beforehand and this emphasis, in its turn, fed off a culture increasingly oriented towards precaution, prevention and pre-emption (Richter et al., 2006).

This broader trend has helped drive the shift from probabilistic risk assessment to possibilistic speculation about uncertainty in every arena. But in an emergency, information only forms one element of the considerations entered into by the public. Concerns by the authorities over the need to provide the latest, most accurate details, through the most effective channels, miss the wider context entirely. Indeed, there may be a surfeit of information at such times. What matters most is the interpretation of its meaning according to previously determined frameworks that have, by then, evolved across protracted periods (Durodié, 2011).

Worst-cases very rarely happen. Rather, it becomes the pre-emptive actions of those anticipating these – often through the prism of their own insecurities more than any objective evidence – that can alter situations. Triangulating available options with the most-likely scenario would probably be more useful for planning purposes. It may be preferable too not to speculate wildly about what you do not know, or worse, to start acting as if this were true.

In relation to H1N1, despite UK ministers and officials having been advised at an early stage '*that modelling capability would be low due to the lack of available data*', a team '*was asked to produce forecasts*' on a frequent basis regardless (Cabinet Office 2010, pp.66-67). The official inquiry into this episode led by Dame Deirdre Hine later concluded that '*ministers and officials set a great deal of store by modelling*' as it '*provides easily understandable figures*' that '*because of its mathematical and academic nature may seem scientifically very robust*' (ibid). In other words, models provide an aura of knowing what is happening and what might ensue. This establishes authority and enables actions to be taken.

For the UK, the official inquiry estimated the episode to have cost about £1.2billion (or just under $2billion), including expenditure on drugs, vaccines, helplines and other health-related costs (many of which were subsequently assessed to have been next to useless – or worse).[30] In addition, a study published in the British Medical Journal proposed that this took no account of any broader ramifications including the opportunity costs of redirecting resources away from other health services, or factors such as absenteeism resulting from exaggerated fears, and workplace closures estimated to impact GDP between six and sixty times as much as the official estimate (Smith et al. 2009).

If true, that would represent more damage than that inflicted on the British economy over the course of the global market crash of 2008. For the French government the cost of vaccines led to intense criticism as they sought to cancel orders and offload their hastily acquired stockpile on to others (Bradley, 2010). But, above all, it was trust in the authorities that was lost over the course of this episode – a commodity most recognise as being hard to regain.

[30] See, for instance, the Cochrane Review (2014) and the related British Medical Journal website (http://www.bmj.com/tamiflu), while also noting challenges to these (McVernon, 2015).

Far from benefiting from hindsight, the existence of broader cultural insecurities and confusions that encourage a proclivity to imagine the worst are very clear in advance. It is these that now drive risk analysis and that can come to undermine trust in risk management.

3. Communication and Theory

3.1 Risk Communication

The communication of risk is an essential element of strategic management. As noted above, it is most effective in societies that share common aims and values, and hence a common framework for articulating risk. A good crisis response system emerges as an agreed social objective, rather than being dissimulated and operated from above.

Risk communication becomes particularly fraught however in the context of incomplete intelligence regarding prospective, rather than actual, threats (Freedman, 2005). Such situations can expose the extent of passive tolerance of – rather than active support for – the authorities.

Lack of information about particular problems can encourage certain agencies to fill the gap with predictions instead. These, almost inevitably nowadays, place a greater emphasis on vulnerabilities, as they appear easier to assess and hence regulate. But a heightened sense of vulnerability can encourage insecurity too, thereby undermining public morale.

Anticipation is, of course, an important conceptual tool and can, in specific circumstances, serve as a useful exercise. But, as we have seen, by promoting worst-case scenarios it is also possible to imagine and impose rather too much. It is one thing to imagine what might happen, quite another to act as if this were already true.

Reorganizing service provision and focusing public communication around presumptions can be very damaging, both in terms of resource allocation from more evident pressing needs, and by alienating those with alternative analyses or conflicting interpretations.

Risk communication usually conveys a sense of likelihood. But in situations where a probability cannot be ascertained – as is frequently the case – planners ought to become concerned that their incomplete assessments may result in imperfect messages being communicated to the public, with associated problems of credibility.

This is often described as the need to strike a balance between being complacent on the one hand and encouraging undue anxieties on the other. It is assumed that governments who say nothing when aware of possible threats will be accused, should one materialize, of having failed in their duty. Those that warn regularly when little happens might be labelled as alarmist.

So, for instance, as Freedman notes (2005), various governments were chastised for not having provided adequate information to travellers as to the possibility of bomb attacks in Bali prior to October 2002. These were then criticized again for the guidance they produced thereafter, which was perceived by some as overstated and potentially damaging to various regional economies.

Information provision is inevitably understood, either explicitly or implicitly by both communicators and recipients, as being in part at least, a transfer of responsibility and accountability. This may not be welcomed by the recipients, especially if they have had little say in the framing of the messages. In addition, if the details provided are neither specific, nor useful in terms of the possibility they offer of being able to alter particular courses of action or to promote others, then they can only come across as futile exhortations or mantras.

Communication about terrorism, for instance, presents a particular problem as it is usually poor in quality but also necessarily provides information and signals to the potential perpetrator. Unlike advice about natural hazards, warnings about an imminent attack allow detractors to alter the threat they pose.

Indeed, these may choose not to proceed, in order purposefully to undermine trust in the authorities. But while the authorities may worry about this unduly at the time, as we have seen real trust is established well in advance of any emergency on the basis not just of handling previous crises, but also through having established a broader sense of social purpose, direction and identification.

In fact, the focus on information and on what to communicate – or not communicate – is the real problem. In an emergency, people are usually bombarded with a surfeit of facts and pseudo-facts. What they need to know is what the meaning of the events is. It is the interpretation, or the framing, of the situation that matters most.

Rather than painstakingly attempting to measure, grade and communicate threat levels, effective tactical warnings derive from good strategic analysis that allows people to contextualize events. Accordingly, projecting a sense of social purpose is far more important than highlighting vulnerabilities, or even focusing on the technical competence to deal with emergencies. To only address the latter shifts the focus from positive intent and direction to a shallow responsiveness to events that highlights uncertainty.

Of course, there is a constant competition within and outside of government as to the correct interpretation of contemporary circumstances. This is both necessary and healthy. It challenges the leadership to establish a coherent position. This outlook must then be articulated and inculcated throughout government to avoid clashes between its different branches.

More problematically though, it has already been noted that certain factions both inside and beyond the state apparatus, may develop a personal stake in particular approaches or interpretations. These then, either through the pursuit of private profit or for moral authority, seek only to highlight those elements of information that appear to add weight to their preferred frameworks.

Cultural authority derives from the resolution of a clash of meanings or interpretations, within which the official line forms only one voice. It competes for attention with other sources within the establishment, including the media. Whilst terrorism itself is sometimes construed as a form of communication, more often than not nowadays, it is various commentators who project their own interpretation as to the meaning of these events into the vacuum left behind by the perpetrators (Durodié, 2013).

Communication certainly depends on having the means to reach an audience, but more importantly it is dependent on having the ability to convince them. This requires both that the message have some coherent and purposeful content, and also that the various parties share a framework of meaning.

In addition, those involved in strategic communications must be able to decode language and understand that social responses are not always triggered by the matters most immediately at hand.

For instance, when the Iraqi army invaded Kuwait in the summer of 1990, the US Ambassador, W. Nathaniel Howell, was asked by the occupying forces to inform American nationals that they should report to a particular hotel in order to be afforded protection. Concerned that his fellow citizens might be turned into human shields, the Ambassador issued an advisory to the effect that those who believed they would be safer under Iraqi protection could do as he had been advised (Culbertson and Howell, 2001).

He believed – correctly – that most Americans would read between the lines and see through this message. The Iraqis however, believing their instructions had been adhered to, waited by the assembly point whilst American embassy cars hastily extracted their people from where they had been staying and took them to safety.

Such a level of comprehension and the ability to use language as a code is largely dependent upon the gradual and long-term establishment of trust between various parties – well in advance of any emergency. This relationship develops through identification in shared values that have little to do with the specifics of any particular situation.

Blunt and repeated messages that offer little opportunity for dialogue or engagement are often ignored. They come to form part of a background cacophony of sounds and images, which people interpret, not as warnings or advice, but as self-serving social policy statements (or virtue signalling) by those who communicate them (often public authorities perceived of as being increasingly remote and unaccountable).

Ironically then, authorities that make a point of regularly communicating to the public on their emergency readiness and the need for public vigilance, implicitly, if unconsciously, transmit a message that can come to emphasize the very opposite. Far from building up social resilience, which requires protracted engagement with, and support for, positive social goals, this vulnerability-led approach conveys a narrow, operational frame that people find uninspiring and can be repulsed by.

Of course, not all individuals react in a similar way. How people respond in adverse situations – aside from any immediate need they have to act – is shaped through the prism of how they already understand their relationship with the authorities to be, as well as the wider cultural mood. Those who believe government always has their best interests at heart, act accordingly – and so do those who do not.

Complaints that emerge at such times should not always be interpreted as being directly related. Excessive efforts to counteract these, framed in terms of the immediate problem can be pointless or counter-productive. Rather, it is important to identify the wider, often unstated issues that concerns allude to and speak in a language that addresses these.

Most members of the public also understand that it is impossible for the authorities to predict all things with complete accuracy, or to preclude all adversity. Whilst they expect government and its agencies to take reasonable measures to protect individuals and institutions, they rarely want to see society paralyzed through fear of infrequent or marginal events. Nor ought we to wish to see operational preoccupations driving out the need for more strategic and broader human considerations at every turn.

In this vein, at the height of the Cold War in 1969 and in the light of the then spiralling cost of pursuing sub-atomic research, the founding director of Fermilab, Robert Rathbun Wilson, was called to testify before a US Congressional Committee and to account for the work of, what was at the time, the world's most significant particle accelerator.

Some of the assembled Congressmen wanted to know what the overall contribution of high-energy physics would be to securing the nation's defence (or, as they might put it today – addressing security risks and making the US safer).

Wilson advised:

> *'It has nothing to do directly with defending our country, except to make it worth defending'.*[31]

3.2 Framing

As noted above, the interpretation of evidence can, in certain instances, come to matter more than supposed facts themselves. This may come as a surprise to those who value normative outlooks less than empirical data (and even more so, so-called '*Big Data*').[32] But in many instances it is the former that directs action rather than the latter.

For example, the absence of evidence for the existence of weapons of mass destruction in Iraq ahead of the 2003 conflict there, appears to have carried little sway among the key decision-makers (who had planned for an invasion in advance of looking for the evidence anyway). For them, it would seem, the deposing of

[31] Cited at: http://www.nytimes.com/2000/01/18/us/robert-r-wilson-physicist-who-led-fermilab-dies-at-85.html

[32] So-called, in light of the analysis provided by Harkness (2016).

Saddam Hussein was more important. That he was perceived of as being untrustworthy may have further explained in their minds why weapons inspectors were unable to discover any firm proof in the intervening months.[33]

That intelligence encompasses both information as well as how it is interpreted is well understood in security circles, though the tendency remains when speaking of '*intelligence failures*' to look back for missing information, to claim to have received false or misleading information, or simply to appeal to the existence of a surfeit of information to process. Cases where intelligence analysts examine and question their assumptions and frameworks are less frequent.

Nevertheless, interpretative prisms shape how individuals and institutions will respond to events and challenges well in advance of any specific manifestation of any of those occurring. Such outlooks and behaviours are gradually formed through the influence of factors that, as we have seen, may have little to do with any immediate problem or cause. These can include our sense of confidence, optimism, purpose or trust (in ourselves as well as others), as well as wider cultural norms and expectations.

How people act or respond to any particular situation is, accordingly, a product of the legacy of past events, experiences and expectations, as well as of current assumptions and evidence. Real social leadership is to be achieved by shaping these values and outlooks well in advance of any particular problem emerging. Equally, risk communication does not take place in a vacuum. Those engaging in it need to be acutely attuned to the cultural mood that they project their messages into.

That risk analysis and risk management cannot address, let-alone solve, every social ill ought also to be a key lesson for those working in this milieu. To read the academic literature and public health commentary relating to the problems of excessive alcohol consumption, for example, one might be forgiven for thinking otherwise. People drink such beverages for a variety of reasons – but few, if any, do so to benefit their health. Why risk-based health warnings would be imagined to have much of an effect on their behaviour is therefore questionable.

Drinking alcohol is usually engaged in as part of a socialisation process with others. Alternatively – when taken to excess – it may signal the breakdown of social connections and personal meaning. Risk management therefore has little to say about the real reasons for partaking in either moderate, occasionally excessive or ultimately destructive quantities.

It is certainly true that alcohol is damaging in many ways (though some assumptions regarding this in the present may be distorted through the twin prisms of greater awareness and increased public unacceptability) but most who successfully curb their problematic behaviours do so not through enhanced risk awareness but rather

[33] Appealing for pre-emptive intervention almost 6 months ahead of the war, President George W. Bush argued that: '*we cannot wait for the final proof – the smoking gun – that could come in the form of a mushroom cloud*' (The Guardian, 2002).

by encountering something that imbues their life with a renewed meaning and purpose.[34]

In this sense presenting the matter in the language of risk appears as the equivalent of knowing the cost of everything and the value of nothing. As the former British Prime Minister, Tony Blair, noted in a newspaper column responding to the episodes of rioting that occurred across many cities in England in the summer of 2011:

> *'*[W]e *are in danger of the wrong analysis leading to the wrong diagnosis, leading to the wrong prescription'*.

And while, as noted elsewhere (Durodié, 2011), his own interpretation of these events may also have been erroneous, at least he appears to have understood there to be what some sociologists might call a competition or '*search for meaning*' in the aftermath of such incidents (Furedi, 2015; Durodié, 2013), rather than a clear-cut, risk-based analysis and solution based on the evidence.

4. Concluding thoughts

Much contemporary risk analysis and management revolves around the themes of health and safety. In part, this may be because in some way these best capture the increasingly atomised nature of contemporary society. They reflect an individuated focus on existential security that emerged in the aftermath of the ending of the mass political engagement of the last century.

From the discussion above we can discern some key elements:

1. Risk analysis and management have migrated from being primarily technical arenas to touch increasingly on social, cultural and political affairs.

2. The complex tools designed for these can conceal the moral values and political persuasions that lie behind them and thereby undermine trust.

3. Emphasising worst-cases rather than most likely scenarios and highlighting possibilities over probabilities may further alienate the public.

4. Modelling experts need to be conscious of the cultural basis for their selection of risks and the vagaries of interpreting the meaning of their data.

5. Trust is best maintained by inspiring and engaging the intended audience rather than exhorting them to act in accordance with assumed concerns.

It is precisely because the conceptualisation of risk is embedded within a network of contestable cultural priorities and presumptions that risk managers cannot avoid or bypass the need to engage the public in a wider discussion regarding the values implicit within their equations and models. Presumptions of objectivity necessarily

[34] See the talk given by the GP, Dr Michael Fitzpatrick on this at the debate '*Boozy Britain: A Nation of Binge Drinkers?*', part of the Battle of Ideas Festival and available at Section 4 of: http://library.fora.tv/2008/11/02/Boozy_Britain_A_Nation_of_Binge_Drinkers

lead to a disconnection between theory and practice as the purpose of risk communication is then simply assumed rather than agreed on.

The 'Risk Society' was originally framed by radicals around concerns pertaining to the impact of environmental damage (Beck, 1986), while more recently, in the aftermath of 9/11, more conservative social actors bought into the 'Culture of Fear' it encouraged through the prism of counterterrorism (Furedi, 2002). Accordingly, it has become the dominant outlook of almost all significant social actors. In some ways it has become an organising framework for an age devoid of other principles around which to cohere.

Process and pragmatism now appear to determine everything. But these can simply provide a smokescreen of numbers that conceal the implicit (and occasionally explicit) outlooks and values that lie behind them. They allow decisions to be made that effectively bypass broader engagement.

Theorising about anything inevitably opens up the door to the possibility of being found wanting in the face of so-called '*hard*' evidence. But theories themselves – as attempts to find order in the world – are an analysis, or interpretation, that emerge from and are mediated by, experience. The attempt to then apply these, through policy and practice, also requires clarity of purpose.

Accordingly, when outcomes fail to match intentions, it may be due either to our misinterpreting events and evidence, or our having unclear aims in the first place. Both of these necessitate as a prerequisite having a finely attuned understanding not just of technical matters, but of cultural circumstances and drivers. Clear values – both moral and political – may come to matter more to validating and trusting risk analysis and management than anything else.

In focusing on these we will also, inevitably, have to engage much more with those often on the receiving end of well-meaning (though occasionally misguided) risk management. We have seen in recent times a turn against the tyranny of so-called elites and their experts (Hume, 2017). It is high-time, if these hope to be trusted, for them to try to bridge the gap between themselves and the public at large.

As the great Enlightenment humanist, John Stuart Mill, noted in the concluding passage of his classic work '*On Liberty*' (1859):

> *'a State which dwarfs its men, in order that they may be more docile instruments in its hands, even for beneficial purposes, will find that with small men no great thing can really be accomplished.*

For risk analysis to be valid and risk management to be trusted those articulating these need to stop talking *to* those they purport to serve and start instead to work *with* them.

References

Adams, J. (1995). *Risk*, UCL Press, London

Appleton, J. (2006). *The Case against Vetting: How the child protection industry is poisoning adult-child relations*, Manifesto Club, London. Available from: http://www.statewatch.org/news/2006/oct/THE%20CASE%20AGAINST%20VETTING.pdf (accessed 6 April 2017)

Aven, T. and Renn, O. (2009). On risk defined as an event where the outcome is uncertain, *Journal of Risk Research*, Vol.12, No.1, pp.1-11

BBC (1999), *What is the Third Way?* 27 September. Available from: http://news.bbc.co.uk/1/hi/458626.stm (accessed 6 April 2017)

BBC (2016a). *George Osborne defends Treasury's gloomy EU exit forecast*, 18 April. Available from: http://www.bbc.co.uk/news/uk-politics-eu-referendum-36070761 (accessed 6 April 2017)

BBC (2016b). *Have I Got News For You*, Series 51, Episode 3, 22 April. Available from: http://www.bbc.co.uk/programmes/b078dmkx (accessed 6 April 2017)

Beck, U. (1986). *Risikogesellschaft: Auf dem Weg in eine andere Moderne*, Suhrkamp Verlag KG, Frankfurt am Main, translated into English by Mark Ritter as *Risk Society: Towards a New Modernity*, Sage Publications, London (1992)

Bickerton, C. (2012). *European Integration: From Nation States to Member States*, Oxford University Press, UK

Bradley, S. (2010). *Europe seeks to offload flu vaccines*, Swissinfo, 5 January. Available from: http://www.swissinfo.ch/eng/europe-seeks-to-offload-flu-vaccines/8019230 (accessed 6 April 2017)

British Medical Journal (undated). *Tamiflu campaign*. Available from: http://www.bmj.com/tamiflu (accessed 6 April 2017)

Cabinet Office (2008). *National Risk Register*, COI Communications, 289116/0708. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/61934/national_risk_register.pdf (accessed 6 April 2017)

Cabinet Office. (2010). *The 2009 influenza pandemic: An independent review of the UK response to the 2009 influenza pandemic*. London: Cabinet Office. July. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/61252/the2009influenzapandemic-review.pdf (accessed 6 April 2017)

Clarke, M. (2012). The Making of Britain's Libya Strategy, pp.7-13 in Johnson, A. and Mueen, S. (eds.) *Short War, Long Shadow: The Political and Military Legacies of the 2011 Libya Campaign*, Royal United Services Institute for Defence and Security Studies, Stephen Austin & Sons Ltd. 2012. Available from: https://rusi.org/sites/default/files/201203_whr_short_war_long_shadow_0.pdf (accessed 6 April 2017)

Cochrane Review (2014). Details available from: https://community-archive.cochrane.org/features/tamiflu-and-relenza-getting-full-evidence-picture (accessed 6 April 2017)

Culbertson, R. and Howell, W.N. (2001). *Siege: Crisis Leadership – The Survival of US Embassy Kuwait*, Howell Press Inc., Charlottesville

Demerjian, L.M. (ed.) (2016). *The Age of Dystopia: One Genre, Our Fears and Our Future*, Cambridge Scholars Publishing, Newcastle-upon-Tyne

Douglas, M. and Wildavsky, A. (1982). *Risk and Culture: An Essay on the Selection of Technological and Environmental Dangers*, University of California Press, Berkeley

Durodié, B. (2004). The Limitations of Risk Management: dealing with disasters and building social resilience, *Politik*, Vol.8, No.1, pp.14-21

Durodié, B. (2008a). *Strategic Information Management*, report for the National Security Coordination Secretariat, Prime Minister's Office, Singapore, 30 October

Durodié, B. (2008b). *Analysis of the Dutch, National Security Programme, National Risk Assessment, Method Guide, 2008*, report for the National Security Coordination Secretariat, Prime Minister's Office, Singapore

Durodié, B. (2009a). *Inherent Problems of Risk Assessment Methodologies*, unpublished notes for students of the S. Rajaratnam School of International Studies, Nanyang Technological University, Singapore, (available from the author)

Durodié, B. (2009b). The forgotten role of government, *The Straits Times*, 3 August. Available at: http://www.durodie.net/pdf/ForgottenRoleGovt.pdf (accessed 6 April 2017)

Durodié, B. (2011). H1N1 – the social costs of élite confusion, *Journal of Risk Research*, Vol.14, No.5, pp.511-518

Durodié, B. (2013). War on Terror or a Search for Meaning? pp.21-30 in *Looking Back, Looking Forward: Perspectives on Terrorism and Responses to it*, Strategic Multi-layer Assessment (SMA) Occasional White Paper for the US Joint Chiefs of Staff and Department of Defense, Arlington VA

Durodié, B. (2016). £4,300 to quit the EU? Bring me my cheque book, *The Conversation*, 23 May. Available at: http://theconversation.com/4-300-to-quit-the-eu-bring-me-my-cheque-book-59699 (accessed 6 April 2017)

Durodié, B. (2017). Do warnings work? *The Policy Space*, 22 March. Available at: http://www.thepolicyspace.com.au/2017/22/171-do-warnings-work (accessed 6 April 2017)

Financial Times (2016). *U-turn if you want to: 7 policies the UK government has scrapped*, 10 May. Available at: https://www.ft.com/content/d476b856-16bb-11e6-9d98-00386a18e39d (accessed 6 April 2017)

Fischhoff, B. (1995). Risk Perception and Communication Unplugged: Twenty Years of Process, *Risk Analysis*, Vol.15, No.2, pp.137-145

Fitzpatrick, M. (2008). Remarks made at: '*Boozy Britain: A Nation of Binge Drinkers*?', Battle of Ideas Festival, The Barbican, London, UK. Available at Section 4 of: http://library.fora.tv/2008/11/02/Boozy_Britain_A_Nation_of_Binge_Drinkers (accessed 6 April 2017)

Freedman, L. (2005). The Politics of Warning: Terrorism and Risk Communication, *Intelligence and National Security*, Vol.20, No.3, pp.379-418

Furedi, F. (2002). *Culture of Fear: Risk-Taking and the Morality of Low Expectations*, Second Edition, Continuum, UK

Furedi, F. (2003). *Therapy Culture – Cultivating Vulnerability in an Anxious Age*, Routledge, UK

Furedi, F. (2007a). From the Narrative of the Blitz to the Rhetoric of Vulnerability, *Cultural Sociology*, Vol.1, No.2, pp.235-254

Furedi, F. (2007b). Coping With Adversity: The Turn to the Rhetoric of Vulnerability, *Security Journal*, Vol.20, No.3, pp.171-184

Furedi, F. (2007c). The changing meaning of disaster, *Area*, Vol.39, No.4, pp.482-489

Furedi, F. and Bristow, J. (2008). *Licensed to Hug: How Child Protection Policies are Poisoning the Relationship Between the Generations and Damaging the Voluntary Sector*, Civitas, London

Furedi, F. (2009). Precautionary Culture and the Rise of Possibilistic Risk Assessment, *Erasmus Law Review*, Vol.2, No.2, pp.197-220

Furedi, F. (2015). Information Overload or a Search for Meaning? *The American Interest*, Vol.11, No.4.
Available at: http://www.the-american-interest.com/2015/12/17/information-overload-or-a-search-for-meaning/ (accessed 6 April 2017)

Giddens, A. (1999). *Runaway World: How Globalization is Reshaping Our Lives*, Profile Books, London

Goerlandt, F., Khakzad, N. and Reniers, G. (2017). Validity and validation of safety-related quantitative risk analysis: a review, *Safety Science*, In Press

Harkness, T. (2016). *Big Data: Does Size Matter*? Bloomsbury Publishing, London, UK

Heartfield, J. (2013). *The European Union and the End of Politics*, Zero Books, Hampshire, UK

HM Government (2002). *Iraq's Weapons of Mass Destruction: The Assessment of the British Government*. HMSO, London (September). Available from: http://nsarchive.gwu.edu/NSAEBB/NSAEBB80/wmd11.pdf (accessed 6 April 2017)

HM Government (2016). *HM Treasury analysis: the long-term economic impact of EU membership and the alternatives*. Cm 9250, HMSO, London (April). Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/517415/treasury_analysis_economic_impact_of_eu_membership_web.pdf (accessed 6 April 2017)

Hume, M. (2017). *Revolting! How The Establishment Are Undermining Democracy And What They're Afraid Of*, William Collins, London, UK

McVernon, J. (2015). Controversies in medicine: the rise and fall of the challenge to Tamiflu, *The Conversation*, 29 September. Available from: http://theconversation.com/controversies-in-medicine-the-rise-and-fall-of-the-challenge-to-tamiflu-38287 (accessed 6 April 2017)

Merton, R. (1948). The Self-Fulfilling Prophecy, *The Antioch Review*. Vol.68, No.1, pp.171-190

Mill, J.S. (1859). *On Liberty*, John W. Parker and Son, London

Ministry of Security and Justice (MVJ) (2014). *Working with scenarios, risk assessment and capabilities in the National Safety and Security Strategy of the Netherlands*, by the Method Group for National Safety and Security (SNV). Available from: https://english.nctv.nl/binaries/working-with-scenarios-risk-assessment-and-capabilities_tcm32-84297.pdf (accessed 6 April 2017)

Ministry of the Interior and Kingdom Relations (MIBZK) (2007). *National Security: Strategy and Work programme 2007-2008*, The Hague (May 2007). Available from: http://www.ecfr.eu/page/-/Pays_Bas_-_2007_-_National_Security_and_Work_Programme_2007-2008.pdf (accessed 6 April 2017)

Ministry of the Interior and Kingdom Relations (MIBZK) (2008). *National Risk Assessment Method Guide*, The Hague (June)

National Institute for Public Health and the Environment (RIVM) (2009). *Working with scenarios, risk assessment and capabilities in the National Safety and Security Strategy of the Netherlands*. Available from: http://www.preventionweb.net/files/26422_guidancemethodologynationalsafetyan.pdf (accessed 6 April 2017)

National Institute for Public Health and the Environment (RIVM) (2014). *National Risk Assessment 6*, by the Network of Analysts for National Security (ANV) for the

National Steering Committee for National Safety and Security (SNV). Available from: https://english.nctv.nl/binaries/007328-nrb-6-engels-definitief_tcm32-84267.pdf (accessed 6 April 2017)

O'Neill, O. (2002). *A Question of Trust*, BBC Reith Lectures. Available from: http://www.bbc.co.uk/programmes/p00ghvd8 (accessed 6 April 2017)

Renn, O. (1998). Three decades of risk research: Accomplishments and new challenges, *Journal of Risk Research*, Vol.1, No.1, pp.49-71

Richter, I., Berking, S. and Müller-Schmid, R. (eds.) (2006). *Risk Society and the Culture of Precaution*, Palgrave Macmillan, London

Slovic, P. (1987). Perception of Risk, *Science*, Vol.236, No.4799, pp.280-285

Smith, R., Keogh-Brown, M.R., Barnett, T. and Tait, J. (2009). The Economy-Wide Impact of Pandemic Influenza on the UK: A Computable General Equilibrium Modelling Experiment, *British Medical Journal*, Vol.339, No.7733, pp.1298

Society for Risk Analysis (2015). *SRA glossary*. Committee on Foundations of Risk Analysis. Available from: http://www.sra.org/sites/default/files/pdf/SRA-glossary-approved22june2015-x.pdf (accessed 6 April 2017)

Thaler, R. and Sunstein, C. (2008). *Nudge: Improving Decisions about Health, Wealth and Happiness*, Yale University Press, New Haven

The Guardian (2002). *We cannot wait for the smoking gun*, 8 October. Available from: https://www.theguardian.com/world/2002/oct/08/iraq.usa (accessed 6 April 2017)

The New York Times (2000). *Robert R. Wilson, Physicist who led Fermilab dies at 85*, 18 January. Available from: http://www.nytimes.com/2000/01/18/us/robert-r-wilson-physicist-who-led-fermilab-dies-at-85.html (accessed 6 April 2017)

The Telegraph (2016). *The maths formula that proves Brexit will be a disaster … according to George Osborne*, Michael Deacon, 18 April. Available at: http://www.telegraph.co.uk/news/2016/04/18/the-maths-formula-that-proves-brexit-will-be-a-disaster-accordin/ (accessed 6 April 2017)

US Department of Homeland Security (2008). *DHS Risk Lexicon*, Washington DC. Available from: https://www.dhs.gov/xlibrary/assets/dhs_risk_lexicon.pdf (accessed 6 April 2017)

Veland, H., Amundrud, A. and Aven, T. (2013). Foundational issues in relation to national risk assessment methodologies, *Journal of Risk and Reliability*, Vol.227, No.3, pp.348-358

Vlek, C. (2013). How Solid is the Dutch (and the British) National Risk Assessment? Overview and Decision-Theoretic Evaluation, *Risk Analysis*, Vol.33, No.6, pp.948-971

WHO (World Health Organization) (2009). *Influenza A(H1N1)*. Statement by WHO Director-General, Dr Margaret Chan, April 29. Geneva. Available from: http://www.who.int/mediacentre/news/statements/2009/h1n1_20090429/en/ (accessed 6 April 2017)

ACKNOWLEDGEMENTS

I am grateful to Professor Julie Barnett of the University of Bath for the opportunity to present the opening Key-Note Address to the Society for Risk Analysis – Europe conference there in 2016 from which much of the analysis presented derives.

I also wish to record my thanks to a number of key thinkers who have helped my thinking in these areas over the years. These have included: John Adams, David Ball, Roger Bate, Michael Fitzpatrick, Frank Furedi, Ragnar Löfstedt, Steve Rayner and Michael Rogers.

Elements of this work have benefited from an award by the Gerda Henkel Foundation under their Special Programme for Security, Society and the State (grant number AZ 03/KF/14). Finally, I am indebted to the three anonymous reviewers of earlier drafts whose comments have helped me focus my thoughts somewhat better.